

AMENDMENTS TO THE CLAIMS

1. (Currently Amended): A filter, comprising:

a block of dielectric material having a top surface, a bottom surface, two opposing first side-walls connecting said top surface to said bottom surface along the width of said block and two opposing second side-walls connecting said top surface to said bottom surface along the height of said block;

two input/output pads on one of said first side walls;

at least three holes extending along the width of said block and extending through said block from said top surface to said bottom surface, wherein at least one of said at least three holes which is located at the end of the at least three holes is offset, or off a line bisecting the remaining holes of the at least three holes;

conductive material substantially covering said bottom surface said first and second side-wall surfaces and said inner surfaces of said at least three holes;

each of said holes have patterns of conductive material on said top surface, surrounding said holes;

~~said center of~~ said offset hole having a center which is a distance Y1 from a center of a hole adjacent to the offset hole, said distance Y1 being perpendicular to the filter's first side walls;

said center of said offset hole is a distance X1, from the center of said adjacent hole, said distance X1 being parallel to the filter's first side walls;

a first pattern of conductive material between said offset hole and the adjacent hole, where said first pattern comprises a first arm of conductive material parallel to an edge of the conductive material of the offset hole and parallel to the filter's first side walls, a second arm of conductive material perpendicular to said first arm of conductive material, and a third arm of conductive material parallel to the first arm of conductive material and perpendicular to the second arm of conductive material said first pattern of conductive material is connected to the first of said input/output pads on one of said first side walls;

said edge of said offset hole's pattern of conductive material has a capacitance C2 from the edge of conductive material surrounding the adjacent hole, where C2 is the capacitance between two opposite edges of said offset hole's pattern of conductive material and said adjacent hole's pattern of conductive material;

where said offset hole is next to the first arm of conductive material where a capacitance C1 is provided between the conductive material surrounding said offset hole and the first arm of conductive material;

a second pattern conductive material opposite the first pattern of material, where said second pattern has a width, W, and a length, L, said second pattern is connected to the conductive material on one of said first side walls; and

a capacitance C3 which is the capacitance between said pattern of hole adjacent to said offset hole and said first pattern is provided; and

a third pattern of conductive material between a fifth and a sixth hole where said third pattern is connected to said second input/output pad.

2. (Original): The filter of claim 1 wherein $W: 0.5 \text{ mm} \geq W \geq 0.1 \text{ mm}$, $L: 3.0 \text{ mm} \geq L \geq 0.5 \text{ mm}$, $X1: 4.0 \text{ mm} \geq X1 \geq 1.0 \text{ mm}$ and $Y1: 2.0 \text{ mm} \geq Y1 \geq 0 \text{ mm}$.

3. (Previously Amended): The filter of claims 1 or 2 wherein $C1 > C3 > C2$.

4. (Previously Amended): A duplexer filter comprising:

a block of dielectric material having a top surface, a bottom surface, two opposing side-walls connecting said top surface to said bottom surface along the width of said block and two opposing side-walls connecting said top surface to said bottom surface along the height of said block, said block having a higher band and a lower band;

three input/output pads on one of said side-walls;

multiple holes spaced along the width of said block and extending through said block from said top surface to said bottom surface, wherein a first hole is located at a first location and where said first hole has a center which is offset or off a line bisecting the remaining holes;

conductive material substantially covering said bottom surface said side-wall surfaces and said inner surfaces of said holes;

said center of said offset hole is a distance Y1 from a center of a hole adjacent to said offset hole, said distance Y1 being perpendicular to the width of the filter's side walls;

said center of said offset hole is a distance $X1$, from the center of said adjacent hole said distance $X1$ being parallel to the width of the filter's side walls;

a first pattern of conductive material connected to one of said side walls, where said first pattern is located between said first offset hole and the next adjacent hole to the first offset hole and has a width W and a length L ;

a second pattern of conductive material connected to said first input/output pad, where said second pattern is located between a non-offset hole of lower band and the next adjacent non-offset hole of higher band;

where said first offset hole is next to the second pattern of conductive material with a capacitance $C1$ between the conductive material surrounding said first offset hole and the second pattern of conductive material;

a second capacitance $C2$ which is the capacitance between the pattern of said next adjacent hole to said first offset hole and said conductive material surrounding said first offset hole; and

a third capacitance $C3$ which is the capacitance between said second pattern of conductive material and said pattern of said next adjacent hole to said first offset hole.

5. (Original): The filter of claim 4 wherein at least two of said holes are transmission poles and the number of transmission poles is at least two in each of a higher and lower band of frequencies.

6. (Previously Amended): The filter of claim 4 wherein the frequency of the offset hole at the center of said duplexer filter is nearly equal to that of a higher band of frequencies.

7. (Previously Amended): The filter of claim 5 wherein the frequency of the offset hole at the center of said duplexer filter is nearly equal to that of a higher band of frequencies.

8. (Original): The filter of claim 4 wherein W : $0.5 \text{ mm} \geq W \geq 0.1 \text{ mm}$, L : $3.0 \text{ mm} \geq L \geq 0.5 \text{ mm}$, $X1$: $4.0 \text{ mm} \geq X1 \geq 1.0 \text{ mm}$ and $Y1$: $2.0 \text{ mm} \geq Y1 \geq 0 \text{ mm}$.

9. (Original): The filter of claim 5 wherein $W: 0.5 \text{ mm} \geq W \geq 0.1 \text{ mm}$, $L: 3.0 \text{ mm} \geq L \geq 0.5 \text{ mm}$, $X1: 4.0 \text{ mm} \geq X1 \geq 1.0 \text{ mm}$ and $Y1: 2.0 \text{ mm} \geq Y1 \geq 0 \text{ mm}$.

10. (Original): The filter of claim 6 wherein $W: 0.5 \text{ mm} \geq W \geq 0.1 \text{ mm}$, $L: 3.0 \text{ mm} \geq L \geq 0.5 \text{ mm}$, $X1: 4.0 \text{ mm} \geq X1 \geq 1.0 \text{ mm}$ and $Y1: 2.0 \text{ mm} \geq Y1 \geq 0 \text{ mm}$.

11. (Original): The filter of claim 7 wherein $W: 0.5 \text{ mm} \geq W \geq 0.1 \text{ mm}$, $L: 3.0 \text{ mm} \geq L \geq 0.5 \text{ mm}$, $X1: 4.0 \text{ mm} \geq X1 \geq 1.0 \text{ mm}$ and $Y1: 2.0 \text{ mm} \geq Y1 \geq 0 \text{ mm}$.

12. (Previously Amended): The filter of claims 4, 5, 6, 7, 8, 9, 10 or 11 wherein $C1 > C3 > C2$.

13. (Currently Amended): The filter of claim 4 where said offset hole has a right and left side with reference to the top surface, and wherein the offset hole ~~is~~ has a line of four holes to the right of said offset hole and four holes to the left said offset hole.

14. (Previously Amended): The filter of claim 4 where there are two offset holes, each of said holes having a right and left side with reference to the top surface, the first offset hole having three holes to the left and three non-offset holes to the right of its location, with said second offset hole to the right of the last of said non-offset holes.

15. (Previously Amended): The filter of claim 4 where there are three offset holes, each of said holes having a right and left side with reference to the top surface, with one offset hole on each of the two ends of said filter and the third to the right of two non-offset holes and to the left of three non-offset holes.

16. (Previously Amended): The filter of claim 4 where the filter has a right end and a left end with reference to the top surface, and where there are two offset holes, each of the holes having a right side and a left side with reference to the top surface, with one offset hole on the left end of said filter and the offset hole having two non-offset holes to the left of said second offset hole and three non-offset holes to the right of said second offset hole.